

# Transportation Technologies

## Water Rocket Design Project



People view transportation as one of life's basic needs. The transportation system is a complex network of interconnected components that operate on land, on water, in the air and in space. Although travelling into space has been realized, it has not yet

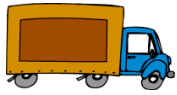


become a fully integrated part of the larger transportation system. *Ref: ITEA (2000) Standards for Technological literacy, p. 175.*



## Official Rules

1.	The result must be a space transportation vehicle capable of carrying a payload (ex. Egg). NO commercially finished or model products may be used.
2.	The pressurized portion of the rocket must consist of one plastic pop bottle (serves as engine). It CANNOT be cut, punctured, or damaged in any way or the rocket will not hold the air pressure.
3.	No metal parts other than aluminum soft drink cans will be allowed on the rocket.
4.	The vehicle must include guidance, propulsion, payload, and recovery systems.
5.	Students must label rockets with student name/group name/logo.
6.	All energy imparted to the rocket must originate from the water/air pressure combination provided by the rocket supervisor. No other potential or kinetic source of energy will be permitted.
7.	All rockets will be launched at a pressure of 60 pounds per square inch and will be filled with water prior to launch. Amount of tap water will be decided by the group members.
8.	All participants in the rocket competition will be given an opportunity to launch a practice rocket during the designated launch trial. Modification for your final design can be made based on your trial launch.
9.	Participants are encouraged to test their rocket using the simulator software provided.
10.	On the day of the competition only one launch is allowed per rocket unless the competition supervisor deems it necessary.
11.	Fins or other attachments must not extend below the throat of the base bottle in order to insure proper attachment to the launcher.
12.	<b>All rockets will be launched with the launcher provided by competition supervisors.</b>
13.	Winners will be based on meeting all requirements (Best in Design) and the total distance traveled in the direction the launcher is pointed before the rocket touches the ground (Best in Performance).
14.	All participants are expected to demonstrate good sportsmanship and follow all school rules at all times.
15.	Only school appropriate designs, decorations or bottles may be used. (2 liter soft drink bottles, aluminum soft drink cans, or small soft drink or water bottles.) Competition supervisors reserve the right to deny any inappropriate or unsafe designs the opportunity to compete.



## CHALLENGE:

This activity will allow you to take on the role of an engineer for NASA. You will design, build, and launch a compressed air rocket/water rocket made from a plastic soda bottle that will fly as straight and stable as possible and return its payload safely back to Earth. The rocket must launch as one complete unit, but may come down as separate pieces.



## EVALUATION:

The evaluation will rate the following:

### 1. **Rocket design** (Tech Department)

- ✓ creativity
- ✓ workmanship

### 2. **Rocket performance** (Science Department)

- ✓ flight path (straightness/stability of flight)
- ✓ distance travelled
- ✓ payload survival (egg's condition)

### 3. In addition, winners of each of the following will receive additional points:

- Most creative (as voted by the class)
- Best built (as voted by the class)
- Best overall flight (as voted by the class)